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PEM Fuel Cell**ABSTRACT**

The invention disclosed herein is directed toward a novel structural design for a PEM fuel cell, as well as a novel method of creating an anode and a cathode via a sputtering technique. This invention can be used with hydrogen or direct methanol fuel cells. The geometry, discussed more fully above, allows a design engineer to construct a compact fuel cell useful in portable devices requiring battery power. In addition to facilitating connecting multiple fuel cells together in a layer, the design of this invention allows for the creation of fuel cell stacks. The sputtering disclosed herein is comprised of sputtering thin film catalysts onto ribbed surfaces, thereby creating anodes and cathodes.

15 In order for a high effective surface area for the fuel and oxidant and their respective reactions to be created, a porous catalyst could be used. In addition, the thickness of the catalysts can be chosen in such a way as to support electron conduction and, therefore, to allow the catalyst and the surface upon which it was sputtered to act as an anode and a cathode.